CLAIMS

1. In a wireless CDMA system in which orthogonal spreading codes are used, a method of reducing multiple access interference caused by a loss of orthogonality between multiple spread spectrum communications signals, the method comprising the steps of:

(a) receiving over a multi-path channel the multiple communications signals ;

(b) passing the received signals through a plurality of correlation branches and combining the outputs of the correlator branches to produce a combined signal;

(c) passing the combined output signal through an adaptive equaliser; and

(d) demodulating the equaliser output.

2. A method according to claim 1 further including adapting the equaliser using an adaptive loop including pilot de-modulation.

3. A method of reducing multiple access interference between multiple communications signals, the method including the steps of:

(i) receiving over a multi-path channel the multiple communications signals ;

(ii) recovering from the received signals a plurality of signals of interest each of which corresponds with a different one of the paths of the multi-path channel;

(iii) estimating a weight for each of the paths of each of the signals recovered in step (ii);

(iv) offsetting each of the recovered signals by an appropriate delay;

(v) applying to each of the recovered signals a scale factor which is the conjugate of the corresponding weight estimated in step (iii);

(vi) after carrying out steps (iv) and (v) on the recovered signals combining them to produce a combined signal; and

(v) passing the combined signal through an equaliser to produce an output; and

(vi)demodulating the equaliser output.

4. A method according to claim 3 further including adapting the equaliser using an adaptive loop which includes pilot demodulation.

5. A method as according to any preceding claim, wherein a normalisation process is carried out prior to passing the combined signal through the equaliser.

6. A method as claimed in claim 5, wherein the normalisation process involves taking an exponential weighted or slide window average of the combined signal.

7. A method as claimed in any one of the preceding claims, wherein the equaliser is an adaptive order equaliser whose length is adaptively adjusted.

8. A method as claimed in claim 7, wherein the order of the equaliser is adjusted according to an adaptive order algorithm of which the optimisation criterion is minimum mean square error.

9. A method as claimed in any one of the preceding claims, wherein the equaliser applies a recursive least square algorithm.

10. Apparatus for use in a receiver in a communications system in which system signals are transmitted over multi-path channels, the apparatus including:

means to recover from a signal received over one of said multi-path channels a plurality of signals of interest, each of the recovered signals corresponding to a different one of the paths of the one multi-path channels;

means to estimate a weight for each of the paths of each of the recovered signals;

means to offset each of the recovered signals by an appropriate delay;

means to apply to each of the recovered signals a scale factor which is the conjugate of the respective weight;

means to combine the recovered signals after their offsetting and scaling to produce an composite signal;

means to normalise the composite signal;

an equaliser to process the composite signal to produce an equalised signal; and

means to demodulate the equalised signal to produce a desired signal.

11. Apparatus according to claim 10 further including an adaptive loop which includes a pilot demodulator.

12. A signal processor for a wireless receiver for use in a communications system in which the receiver receives signals transmitted over multi-path channels, including

processing means to:

recover from a signal received over one of said multi-path channels a plurality of signals of interest, each of the recovered signals corresponding to a different one of the paths of the one multi-path channels

to estimate a weight for each of the paths of each of the recovered signals;

to offset each of the recovered signals by an appropriate delay;

to apply to each of the recovered signals a scale factor which is the conjugate of the respective weight;

to combine the recovered signals after their offsetting and scaling to produce a combined signal;

to normalise the combined signal;

to provide an adaptive equalisation function for the processing of the combined signal and to produce therefrom an equalised signal; and

to demodulate the equalised signal to recover a desired signal.

13. A signal processor according to claim 12 in which the processing means is arranged to adapt the adaptive equaliser using an adaptive loop including pilot demodulation.

14. A mobile terminal for use in a CDMA communications system, the terminal including:

a user interface adapted to allow a user to control the mobile terminal and to input local service signals for transmission and to hear remote service signals recovered from received signals;

a transmitter adapted to transmit the local service signals to a base station via a radio frequency transmit signal; and

a receiver adapted to recover remote service signals from a received composite signal; the receiver including:

a plurality of rake fingers to recover from a signal received over one of said multi-path channels a plurality of signals of interest, each of the recovered signals corresponding to a different one of the paths of the one multi-path channels;

means to combine the recovered signals from the rake fingers to produce a combined signal;

an equaliser to process the combined signal and to increase the orthogonality thereof; and

a demodulator to demodulate the output of the equaliser.

15. A mobile terminal according to claim 14 further including an adaptive loop for adapting the equaliser and including pilot demodulation.